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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/755,673	01/05/2001	Leonard Forbes	MI22-1531	5293

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EXAMINER
NGUYEN, KHIEM D

ART UNIT	PAPER NUMBER
2823	

DATE MAILED: 08/28/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/755,673	FORBES ET AL.	
	Examiner	Art Unit	
	Khiem D Nguyen	2823	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-26 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-26 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 05 January 2001 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

1. Applicant's election without traverse of claims 1-26 in Paper No. 5 is acknowledged.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moradi et al. (USPAP 0076938) in view of Zhang (U.S. Patent 5,886,364).

Moradi teaches a method of forming a capacitor structure, comprising (See page 3, paragraph [0032]-[0034] and FIG. 6):

forming a first electrical node 20;

forming a dielectric layers 24 over the first electrical node;

forming a second electrical node 32 that is electrically separated from the first electrical node wherein the first electrical node, the second electrical node and the dielectric material together defining at least a portion of a capacitor structure.

Moradi teaches forming the nitride-comprising dielectrics layers 24 (See page 3, paragraph [0034]) but fails to teach that the dielectric layer is a layer of metallic aluminum that being ~~entirely transformed into AlN~~ or AlON wherein the listed compounds are described in terms of chemical constituents rather than stoichiometry as recited in present claims 1-3.

Zhang teaches transforming the aluminum film 32 into the aluminum nitride (AlN), aluminum oxide (AlO), and aluminum oxynitride (AlON) layers wherein the listed compounds are described in terms of chemical constituents rather than stoichiometry. See col. 5, lines 43-56 and FIG. 3B. ***It would have been obvious to one of ordinary skill in the art of making semiconductor devices*** to incorporate Zhang's teaching into Moradi's method because in doing so the TFT can be completely shielded from incident light irradiated from the substrate side. See col. 3, lines 8-11.

4. Claims 4-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moradi et al. (USPAP 0076938) in view of Zhang (U.S. Patent 5,886,364).

Moradi teaches a method of forming a capacitor structure, comprising (See page 3, paragraph [0032]-[0034] and FIG. 6):

forming a first electrical node 20 comprises conductively doped silicon;

forming a dielectric layers 24 over the first electrical node;

forming a silicon dioxide layer 30 on the first electrical node;

forming a second electrical node 32 that is electrically separated from the first electrical node wherein the first electrical node, the second electrical node and the dielectric material together defining at least a portion of a capacitor structure.

Moradi teaches forming the nitride-comprising dielectrics layers 24 (See page 3, paragraph [0034]) but fails to teach that the dielectric layer is a layer of metallic aluminum that being entirely transformed to AlN or AlON over the first electrical node wherein the listed compounds are described in terms of chemical constituents rather than stoichiometry as recited in present claims 4, 6-11, 14-19 and 24-25.

Zhang teaches transforming the aluminum film 32 into the aluminum nitride (AlN), aluminum oxide (AlO), and aluminum oxynitride (AlON) layers wherein the listed compounds are described in terms of chemical constituents rather than stoichiometry. See col. 5, lines 43-56 and FIG. 3B. ***It would have been obvious to one of ordinary skill in the art of making semiconductor devices*** to incorporate Zhang's teaching into Moradi's method because in doing so the TFT can be completely shielded from incident light irradiated from the substrate side. See col. 3, lines 8-11.

Moradi teaches forming the silicon dioxide layer 30 between the second electrical node and the dielectric layers wherein the layer of silicon dioxide layer is formed after forming the layer of the dielectric layers (See page 3, paragraph [0032]-[0034] and FIG. 6) but fails to teach forming a layer of silicon dioxide between the first electrical node and the layer of metallic aluminum wherein the silicon dioxide is formed before forming the layer of metallic aluminum and during the transforming of the layer of metallic aluminum as recited in present claims 11, 19, 20 and 22. However, ***it would have been obvious to one of ordinary skill in the art of making semiconductor devices*** to form the silicon dioxide layer before forming the layer of metallic aluminum and during transforming of the layer of metallic aluminum so that the silicon dioxide layer is formed between the first electrical node and the layer of metallic aluminum.

Moradi teaches that the invention encompasses forming of dielectric layers (See page 3, paragraph [0034]) but fails to teach forming a second layer of metallic aluminum on the resulting AlN layer and transforming an entirety of the second layer of metallic aluminum to AlON to form a resulting AlON layer. However, ***it would have been***

obvious to one of ordinary skill in the art of making semiconductor devices to form a second layer of metallic aluminum on the resulating AlN layer and transforming an entirely of the second layer of metallic aluminum to AlON by combining Zhang's teaching into Moradi's method.

Moradi fails to teach providing a transistor adjacent the capacitor structure wherein the transistor and a capacitor structure together defining a DRAM cell comprising the transistor and the capacitor structure as recited in present claim 26.

However, providing a transistor adjacent the capacitor structure wherein the transistor and a capacitor structure together defining a DRAM cell comprising the transistor and the capacitor structure is well-known to ***one of ordinary skill in the art of making semiconductor devices***

Moradi fails to teach the transforming temperature and the thickness of the resulting layers of AlN, AlON and AlO as recited in present claims 5, 7, 9, 10, 12, 13, 15, 17, 18, 21, 23 and 25.

However, it would have been obvious to ***one of ordinary skill in the art of making semiconductor devices*** to determine the workable or optimal transforming temperature and thickness for the resulting layers of AlN, AlON and AlO through routine experimentation and optimization to obtain optimal or desired device performance because the transforming temperature and thickness of the resulting layers of AlN, AlON and AlO are result-effective variables and there is no evidence indicating that the transforming temperature and thickness of the resulting layers of AlN, AlON and AlO are critical and it has been held that it is not inventive to discover the optimum or workable

height of a result-effective variable within given prior art conditions by routine experimentation. See MPEP 2144.05.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Khiem D Nguyen whose telephone number is (703) 306-0210. The examiner can normally be reached on Monday-Friday (8:00 AM - 5:00 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (703) 308-4918. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 746-9179 for regular communications and (703) 746-9179 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

K.N.
August 16, 2002

LONG PHAM
PRIMARY EXAMINER